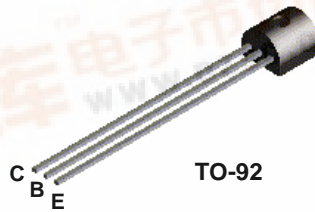


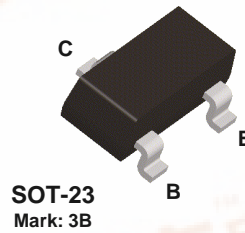


Discrete POWER & Signal Technologies

PN918



MMBT918



NPN RF Transistor

This device is designed for use as RF amplifiers, oscillators and multipliers with collector currents in the 1.0 mA to 30 mA range. Sourced from Process 43.

Absolute Maximum Ratings*

TA = 25°C unless otherwise noted

Symbol	Parameter	Value	Units
V _{CEO}	Collector-Emitter Voltage	15	V
V _{CBO}	Collector-Base Voltage	30	V
V _{EBO}	Emitter-Base Voltage	3.0	V
I _C	Collector Current - Continuous	50	mA
T _J , T _{stg}	Operating and Storage Junction Temperature Range	-55 to +150	°C

*These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

NOTES:

- 1) These ratings are based on a maximum junction temperature of 150 degrees C.
- 2) These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

Thermal Characteristics

TA = 25°C unless otherwise noted

Symbol	Characteristic	Max		Units
		PN918	*MMBT918	
P _D	Total Device Dissipation	350	225	mW
	Derate above 25°C	2.8	1.8	mW/°C
R _{θJC}	Thermal Resistance, Junction to Case	125		°C/W
R _{θJA}	Thermal Resistance, Junction to Ambient	357	556	°C/W

*Device mounted on FR-4 PCB 1.6" X 1.6" X 0.06."



NPN RF Transistor

(continued)

Electrical Characteristics

TA = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Max	Units
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OFF CHARACTERISTICS

$V_{CE(SUS)}$	Collector-Emitter Sustaining Voltage*	$I_C = 3.0 \text{ mA}, I_B = 0$	15		V
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	$I_C = 1.0 \mu\text{A}, I_E = 0$	30		V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	$I_E = 10 \mu\text{A}, I_C = 0$	3.0		V
I_{CBO}	Collector Cutoff Current	$V_{CB} = 15 \text{ V}, I_E = 0$ $V_{CB} = 15 \text{ V}, T_A = 150^\circ\text{C}$		0.01 1.0	μA μA

ON CHARACTERISTICS

h_{FE}	DC Current Gain	$I_C = 3.0 \text{ mA}, V_{CE} = 1.0 \text{ V}$	20		
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 10 \text{ mA}, I_B = 1.0 \text{ mA}$		0.4	V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C = 10 \text{ mA}, I_B = 1.0 \text{ mA}$		1.0	V

SMALL SIGNAL CHARACTERISTICS

f_T	Current Gain - Bandwidth Product	$I_C = 4.0 \text{ mA}, V_{CE} = 10 \text{ V},$ $f = 100 \text{ MHz}$	600		MHz
C_{obo}	Output Capacitance	$V_{CB} = 10 \text{ V}, I_E = 0, f = 1.0 \text{ MHz}$ $V_{CB} = 0, I_E = 0, f = 1.0 \text{ MHz}$		1.7 3.0	pF pF
C_{ibo}	Input Capacitance	$V_{BE} = 0.5 \text{ V}, I_C = 0, f = 1.0 \text{ MHz}$		2.0	pF
NF	Noise Figure	$I_C = 1.0 \text{ mA}, V_{CE} = 6.0 \text{ V},$ $R_G = 400\Omega, f = 60 \text{ MHz}$		6.0	dB

FUNCTIONAL TEST

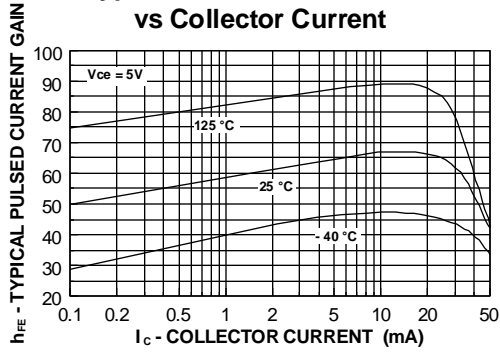
G_{pe}	Amplifier Power Gain	$V_{CB} = 12 \text{ V}, I_C = 6.0 \text{ mA},$ $f = 200 \text{ MHz}$	15		dB
P_O	Power Output	$V_{CB} = 15 \text{ V}, I_C = 8.0 \text{ mA},$ $f = 500 \text{ MHz}$	30		mW
η	Collector Efficiency	$V_{CB} = 15 \text{ V}, I_C = 8.0 \text{ mA},$ $f = 500 \text{ MHz}$	25		%

*Pulse Test: Pulse Width $\leq 300 \mu\text{s}$, Duty Cycle $\leq 2.0\%$

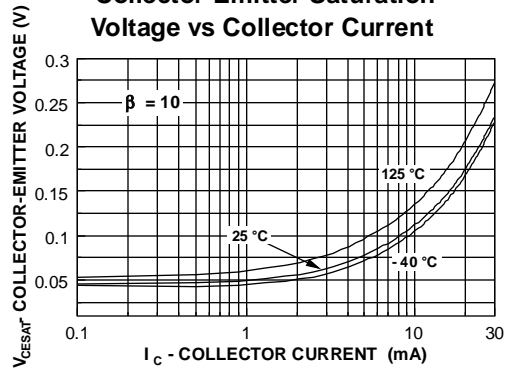
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DC Typical Characteristics

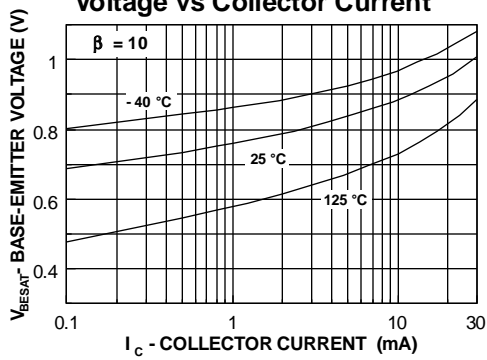
Typical Pulsed Current Gain vs Collector Current



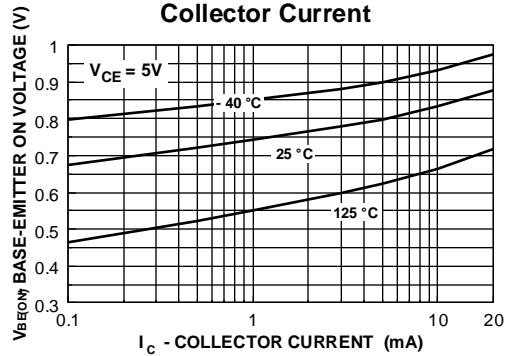
Collector-Emitter Saturation Voltage vs Collector Current



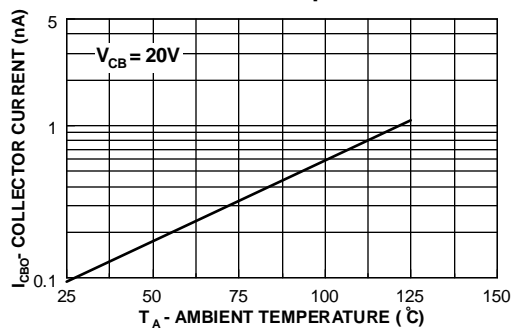
Base-Emitter Saturation Voltage vs Collector Current



Base-Emitter ON Voltage vs Collector Current

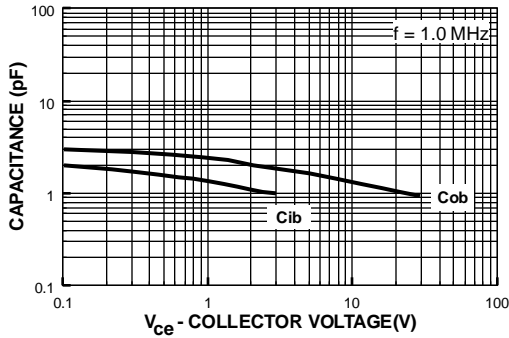


Collector-Cutoff Current vs Ambient Temperature

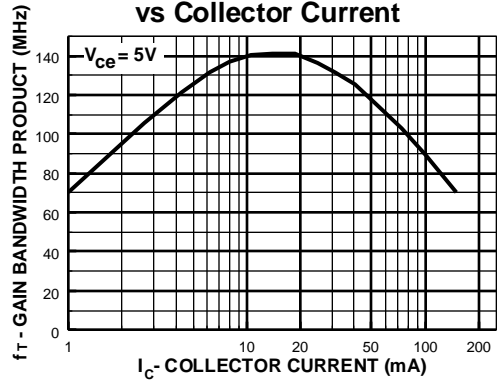


AC Typical Characteristics

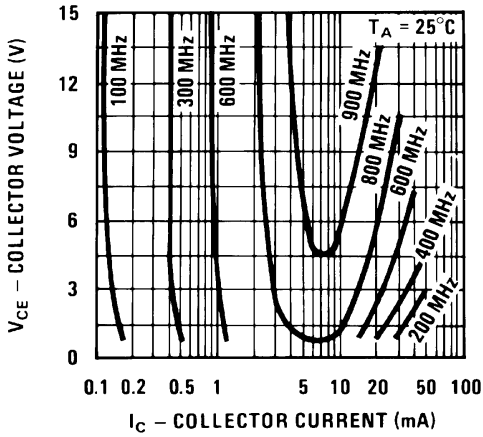
Input and Output Capacitance vs Reverse Voltage



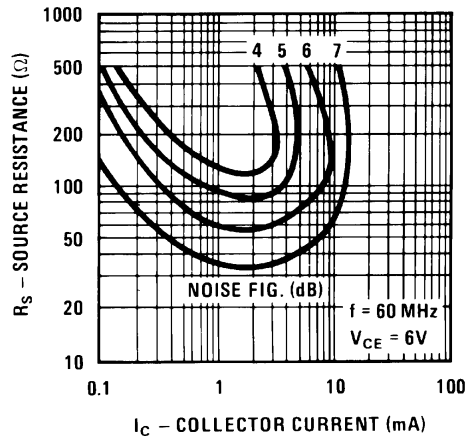
Gain Bandwidth Product vs Collector Current



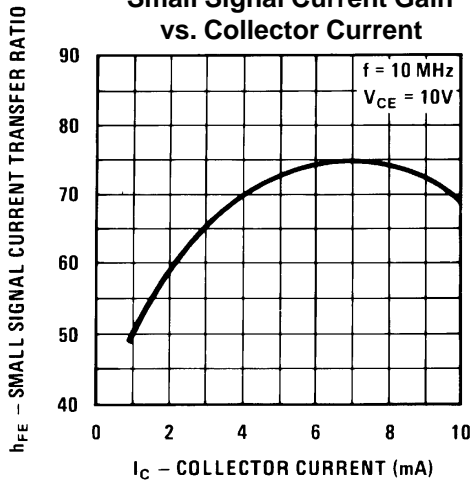
Contours of Constant Gain Bandwidth Product (f_T)



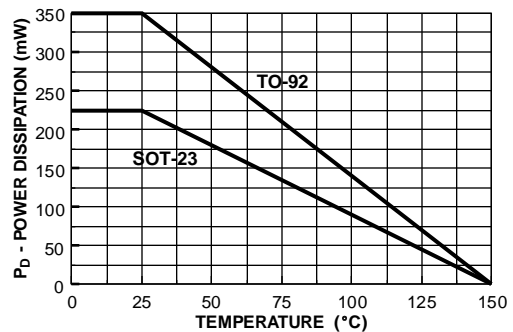
Contours of Constant Noise Figure



Small Signal Current Gain vs. Collector Current



POWER DISSIPATION vs AMBIENT TEMPERATURE



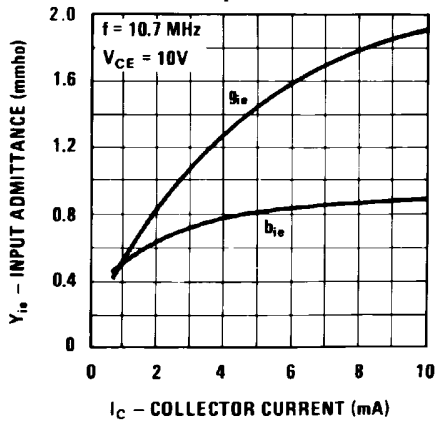
NPN RF Transistor

(continued)

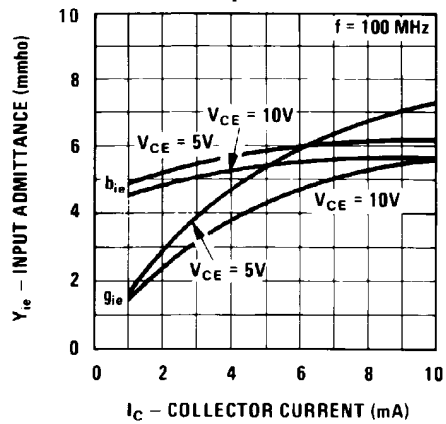
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Common Emitter Y Parameters vs. Frequency

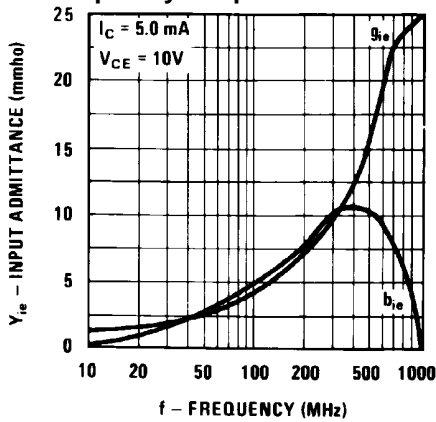
Input Admittance vs. Collector Current-Output Short Circuit



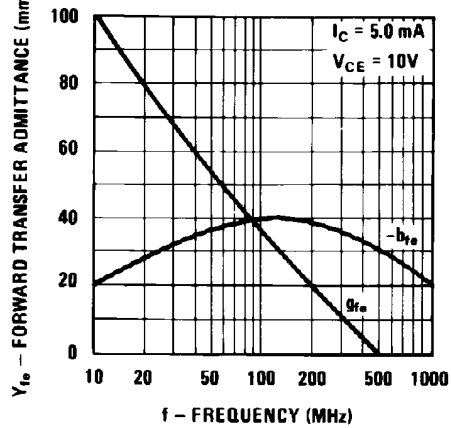
Input Admittance vs. Collector Current-Output Short Circuit



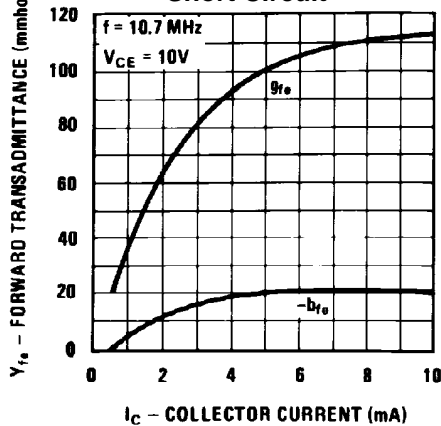
Input Admittance vs. Frequency-Output Short Circuit



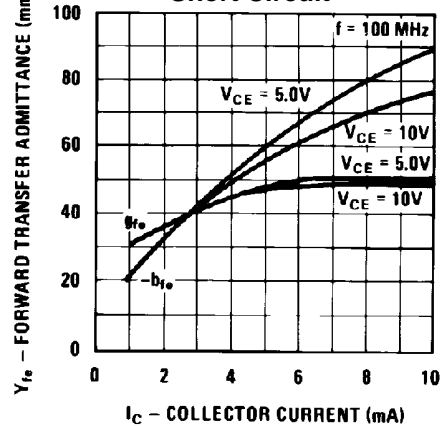
Forward Transfer Admittance vs. Frequency-Output Open Circuit



Forward Transfer Admittance vs. Collector Current-Output Short Circuit

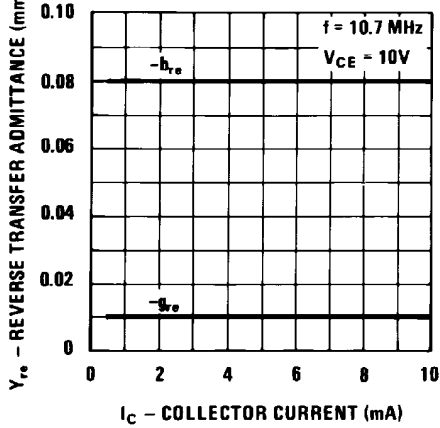


Forward Transfer Admittance vs. Collector Current-Output Short Circuit

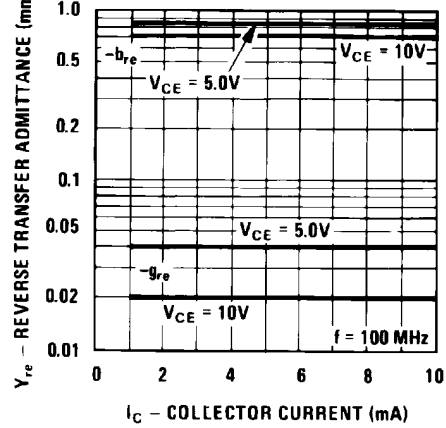


Common Emitter Y Parameters vs. Frequency (continued)

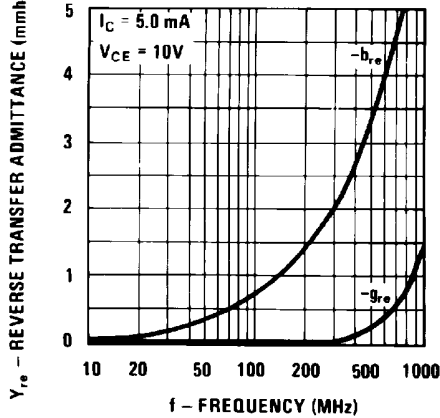
Reverse Transfer Admittance vs. Collector Current-Input Short Circuit



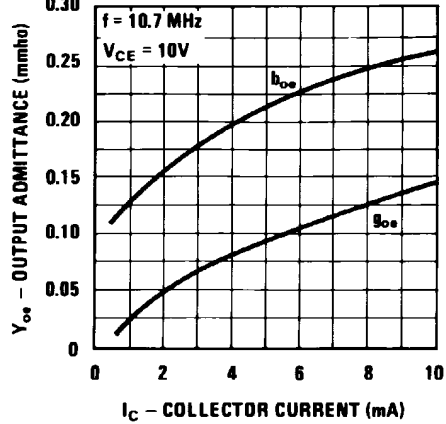
Reverse Transfer Admittance vs. Collector Current-Input Short Circuit



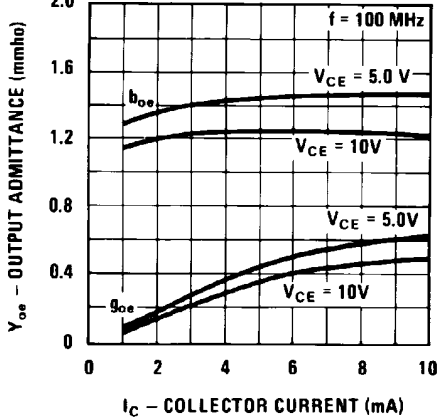
Reverse Transfer Admittance vs. Frequency-Input Short Circuit



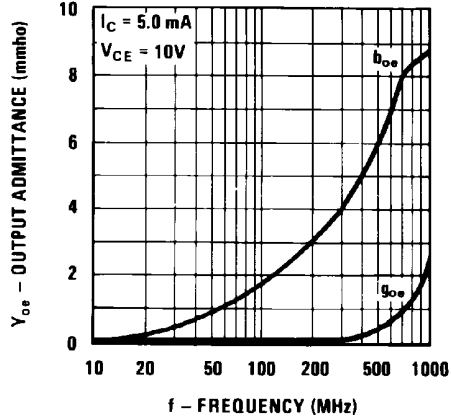
Output Admittance vs. Collector Current-Input Short Circuit



Output Admittance vs. Collector Current-Input Short Circuit



Output Admittance vs. Frequency-Input Short Circuit



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(continued)

PN918 / MMBT918

Test Circuit

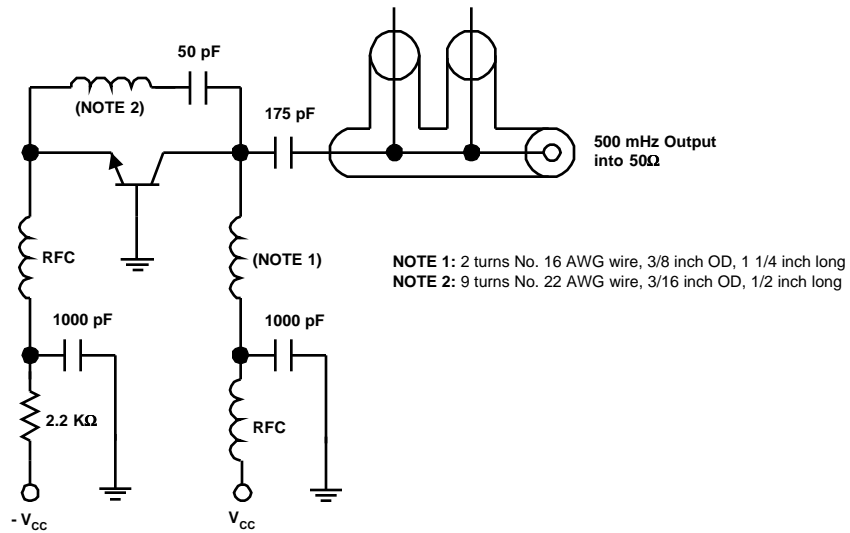


FIGURE 1: 500 MHz Oscillator Circuit